| *FlyBy Math*TM **Alignment**<br>**Mathematics Grade Expectations** |
|---|

## Standard 7.6: Arithmetic, Number, and Operation Concepts

| **Grade Expectations** | *FlyBy Math*TM **Activities** |
|---|---|
| **MHS: 7 Estimates and evaluates the reasonableness of** <u>numerical</u> computations and solutions, including those carried out with <u>technology</u>. | --Predict outcomes and explain results of mathematical models and experiments. |

## Standard 7.7: Geometry and Measurement Concepts

| **Grade Expectations** | *FlyBy Math*TM **Activities** |
|---|---|
| **MHS: 9 Models situations geometrically to solve problems connecting** to <u>other areas of mathematics or to other disciplines (i.e., diagrams, coordinate systems, transformations)</u>. | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. |
| **MHS: 13 Applies concepts of similarity, <u>congruency or right triangle trigonometry</u>** to <u>determine length or angle measures</u> and to solve problems involving scale. | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.<br><br>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. |
| **MHS: 15 Measures and uses units of measures appropriately and consistently when solving problems across the content strands. Makes conversions within or across systems and** <u>makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement</u>. <u>Uses measurement conversion strategies, such as unit/dimensional analysis or uses quotient measures, such as speed and density, that give per unit amounts, or uses product measures, such as person hours to solve problems</u>. | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.<br><br>--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation. |

## Standard 7.8: Functions and Algebra Concepts

| Grade Expectations | *FlyBy Math*™ Activities |
|---|---|
| **MHS: 19** <u>Solves and models problems by **formulating, extending, or generalizing linear and common nonlinear functions/relations.**</u>)<br><br><u>And makes connections among representations of functions/relations (equations, tables, graphs, symbolic notation, text).</u> | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.<br><br>--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. |
| **MHS: 20 Demonstrates conceptual understanding of linear relationships and linear <u>and nonlinear functions</u>** <u>(including $f(x) = ax^2$, $f(x) = ax^3$, absolute value function, exponential growth) through analysis of intercepts, domain, range and constant and variable rates of change in mathematical and contextual situations.</u> | --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.<br><br>--Interpret the slope of a line in the context of a distance-rate-time problem.<br><br>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. |
| **MHS: 21 Demonstrates conceptual understanding of algebraic expressions** by evaluating, simplifying, or <u>writing</u> algebraic expressions; and <u>writes equivalent forms of algebraic expressions or formulas *(d = rt—> r = d/t* or solves a multivariable equation or formula for one variable in terms of the others).</u> | --Use the distance-rate-time formula to predict and analyze aircraft conflicts. |
| **MHS: 22 Demonstrates conceptual understanding of equality** by solving linear equations, systems of <u>two</u> linear equations, or problems using tables, graphs, algebraic manipulation, or technology.<br><br><u>Demonstrates conceptual understanding of inequality by solving linear inequalities, comparing values of systems of linear functions, using tables, graphs, algebraic manipulation, or technology.</u> | --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.<br><br>--Use tables, graphs, and equations to solve aircraft conflict problems. |

## Standard 2.5: Mathematical Dimensions,
## Standard 7.10: Mathematical Problem Solving and Reasoning - Applications

| Grade Expectations | *FlyBy Math*[TM] Activities |
|---|---|
| **MHS: 30 Demonstrate understanding of mathematical problem solving and communication by:**<br>• **Approach and Reasoning**—The strategies and skills used to solve the problem, and the reasoning that supports the approach;<br>• **Execution**—The answer and the mathematical work that supports it;<br>• **Observations and Extensions**—Demonstration of observation, connections, application, extensions, and generalizations;<br>• **Mathematical Communication**—The use of mathematical vocabulary and representation to communicate the solution; and<br>• **Presentation**—Effective communication of how the problem was solved, and of the reasoning used. | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.<br><br>--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system. |